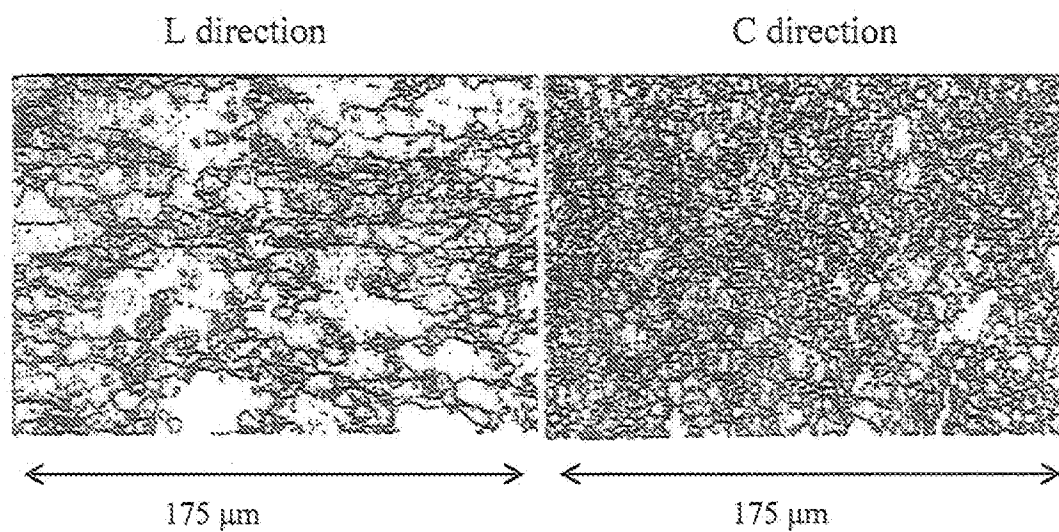


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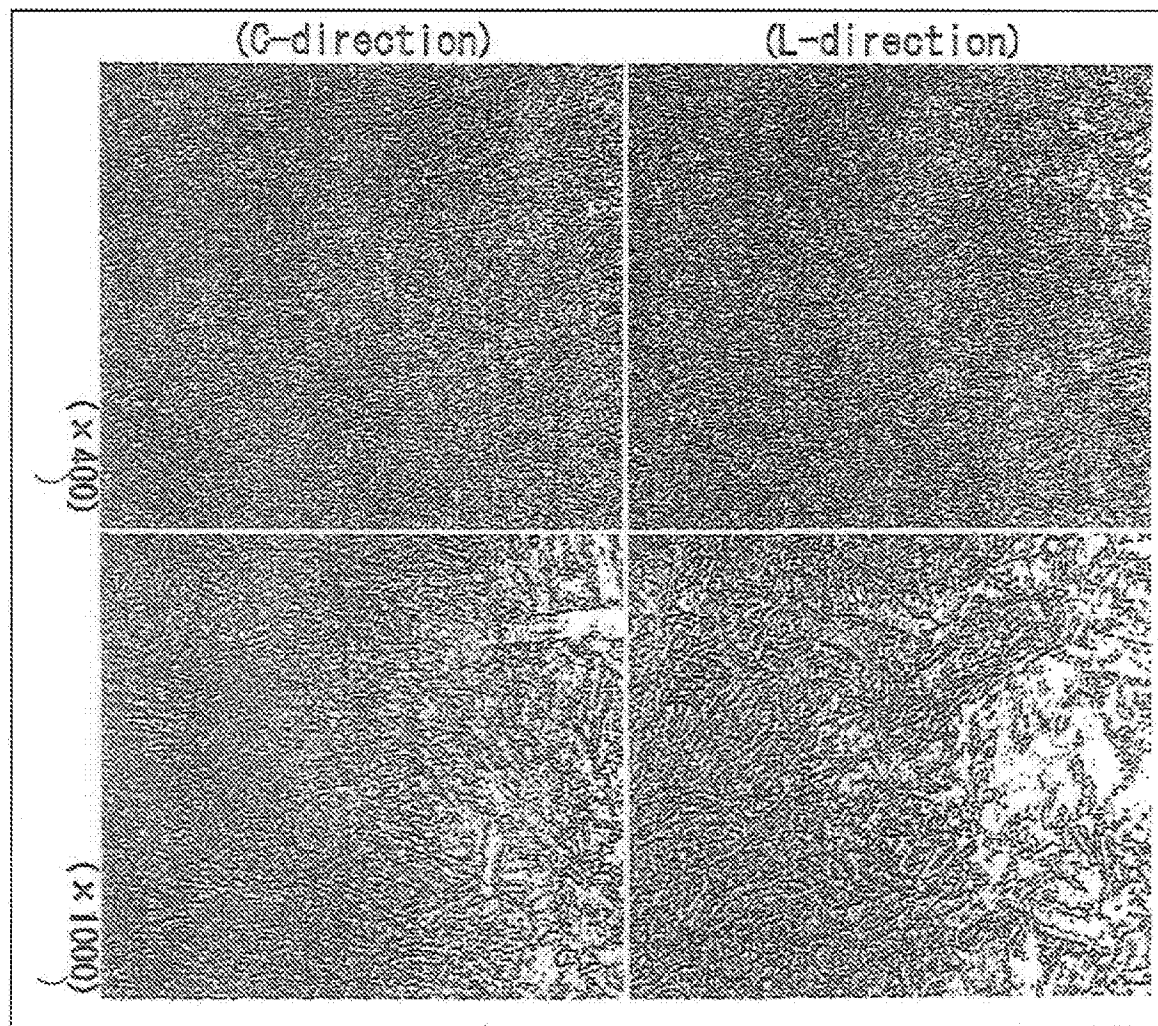
Magnification ratio of the photographs: X400 (Entire width of the photographs: 175 μm)

History Type of steel of the steel pipe: SAE1012 (0.12% C)



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C-Steel Microstructure (1/2t)



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Table 6

No.	Yield strength** MPa	Tensile strength TS MPa	Yield ratio
3-1	507	616	82.3
3-2	565	642	88.0
3-3	616	692	89.0
3-4	506	582	86.9
3-5	637	724	88.0
3-6	560	625	89.6
3-7	538	611	88.1
3-8	521	593	87.9
3-9	431	538	80.1
3-10	582	640	90.9
3-11	445	550	80.9
3-12	600	658	91.2

Table 8

No.	Yield strength** MPa	Tensile strength TS MPa	Yield ratio
4-1	466	550	84.7
4-2	364	448	81.3
4-3	531	612	86.8
4-4	421	517	81.4
4-5	451	522	86.4
4-6	525	575	91.3
4-7	507	596	85.1
4-8	523	618	84.6
4-9	570	657	86.8

Table 10

No.	Yield strength YS MPa	Tensile strength TS MPa	Yield ratio
5-1			
5-2	613	648	94.6
5-3	496	538	92.2
5-4	431	518	83.2
5-5	415	448	92.6
5-6	552	597	92.5
5-7	451	502	89.8
5-8	451	485	93.0
5-9	439	506	86.8
5-10	448	496	90.3
5-11	413	462	89.4
5-12	560	574	97.8
5-13	607	658	92.5

Table 11

No.	Yield point YS MPa	Tensile strength TS MPa	Yield ratio
6-1	589	660	89.2
6-2	486	532	91.4
6-3	513	588	87.2
6-4	601	643	93.5
6-5	554	602	93.7
6-6	592	671	88.2
6-7	568	623	91.2
6-8	596	642	92.8
6-9	639	711	89.7

Table 13

No.	Yield strength YS MPa	Tensile strength TS MPa	Yield ratio
7-1	632	665	95.0
7-2	531	580	91.6
7-3	661	692	95.5
7-4	511	548	93.2
7-5	693	713	95.8
7-6	588	630	93.3
7-7	559	601	93.0
7-8	526	572	92.0
7-9	535	581	92.1
7-10	688	736	93.5
7-11	463	523	88.5

Table 15

No.	Yield strength** MPa	Tensile strength TS MPa	Yield ratio
1-1	504	641	78.6
1-2	824	721	86.5
1-3	540	641	84.2
1-4	885	773	88.6
1-5	660	759	87.0
1-6	687	782	87.9
1-7	610	700	87.1
1-8	520	618	84.1
1-9	444	563	78.9
1-10	553	633	87.4

Table 17

No.	Yield strength** MPa	Tensile strength TS MPa	Yield ratio
2-1	659	761	86.6
2-2	667	753	88.6
2-3	623	739	84.3
2-4	701	796	88.1
2-5	603	678	88.9
2-6	622	708	87.9
2-7	469	539	87.0
2-8	446	530	84.2